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Benefit - Cost Analysis of
Proposed Trucking Operation
From Adanac Molybdenum
Prospect to Whitehorse (ATLIN ROAD)

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1) Introduction

Kerr Addison Mines Limited are currently investigating the possibility of bringing into production a molybdenum property near Atlin, B.C., presently owned by Adanac Mining and Exploration Limited. If the mine does commence production, Kerr Addison propose to ship the molybdenum concentrates by truck over the Atlin Road and the Alaska Highway to Whitehorse. This road, 27 miles of which is in the Yukon Territory (from Jakes Corner to the border) is at present adequate for automobile traffic but would have to be upgraded to handle heavy truck traffic.

The purpose of this study is to compare the costs involved in upgrading the 27 mile Yukon portion of this road, plus the increased maintenance costs, with the benefits that would accrue to the Yukon economy from the proposed trucking operation.

For the purpose of this study, the following assumptions are made:

- 1) the mine will be coming into production in mid 1973
- 2) ore will be milled at a rate of 15,000 tons per day, to produce 30 tons of molybdenum concentrates per day
- 3) based on known ore reserves of 70,000,000 tons, a mine life of 13 years can be anticipated. However, it is possible that further reserves may be discovered after production starts, extending the life of the mine. For this reason a second possibility of a mine life of 20 years will also be considered.
- 4) the trucking operation will be on a contract basis with a trucking firm, and will operate on a 6-day week
- 5) Kerr-Addison will be generating their own power at the mine. The possibility of power being supplied by the Northern Canada Power Commission from the Yukon has been looked into but NCPC and Kerr-Addison are deadlocked

over the price of power to be supplied by NCPC and there appears to be little chance of coming to an agreement. In any case NCPC would require at least 2 years notice, and \$20 million for the construction of a new hydro plant and the Transmission line from the BC/Yukon border* as present capacity is not adequate. In addition, either Kerr-Addison or BC Hydro would have to construct the transmission line from the BC/Yukon border to the mine. There would be benefits to the Yukon economy from the construction of this power plant and Yukon transmission line, but it appears unlikely that the development of the molybdenum mine alone could justify this new hydro installation.

- 6) the proposed 3¢ / gallon increase in fuel tax in the Yukon will be in effect by 1973. This will raise the tax to 14¢ / gallon.
- 7) the personnel employed in the operation and maintenance of the vehicles will live in Whitehorse with their families.

2) Summary and Recommendations

- i) The proposed trucking operation including the transport of diesel fuel for power generation to the mine could create 10 jobs.
- ii) Tangible benefits to the Yukon economy are estimated to be approximately \$144,420 annually.
- iii) The cost of upgrading the 27-mile Yukon portion of the Atlin road to standards required by this trucking operation is estimated to be \$850,000. The bridges have already been upgraded to H20 S16 standards.
- iv) Maintenance is estimated to cost \$2,350 per mile annually after upgrading or approximately \$63,450 per year, for the 27 mile portion of this road. Dust control if necessary would add \$2,000 per mile per year to that amount.

- v) Assuming the life of the mine will be 13 years, the present value of the tangible benefits is approximately \$900,000, and the present value of the total costs (capital expenditure plus maintenance) is approximately \$1,250,000.
- vi) If the mine is assumed to have a life of 20 years, the present value of the benefits becomes approximately \$1,125,000, and present value of total costs becomes approximately \$1,345,000.
- vii) There will be other potential benefits to the Yukon economy from the development of the mine, such as possible employment of Yukon Indians, and provision of wholesale and retail goods and services to the anticipated 200-250 families living in Atlin because of the mine.
- viii) In view of the closeness of the estimated tangible benefits to the anticipated costs of upgrading the road and the additional potential benefits, a strong case can be presented for the upgrading of the road.

5) Benefits to the Yukon Economy

The benefits outlined below represent an estimate of the tangible benefits that would accrue to the Yukon economy. The short time available for this study precluded a more detailed analysis of possible multiplier effects within the economy, so benefits presented here should be considered to be minimum values.

The producing mine would require transportation of 30 tons of concentrates to Whitehorse, and 25 tons of general supplies plus 11,000 - 13,000 gallons of diesel fuel for power generation to the mine daily.

Assuming the trucks only operate 6 days a week these quantities become 35 tons, 29 tons, and 12,800 - 15,200 gallons of fuel daily to allow for the production

ply requirements for the remaining day. Kerr-Addison is thinking in terms of 1 truck with a GVW of 90,000 pounds to haul the concentrates out. However, it does not appear likely that 35 tons of concentrates can be carried within that GVW. Since a load of 35 tons would result in a GVW of at least 100,000 pounds, it is more likely that two truckloads, with approximately 17.5 ton payloads will be used. (GVW of approximately 71,000 pounds). This would probably require at least 2 trucks and 3 drivers assuming each vehicle makes a round trip each day. One return trip could carry the inbound supplies and the other would have to return empty.

The fuel supplier will probably require 3 round trips per day to transport the 12,800 to 15,200 gallons of fuel for power generation. This could mean the use of 3 trucks and 4 drivers.*

The five daily round trips outlined above will accumulate approximately 414,960 vehicle miles over a year (266 mile round trip, 6 days a week). Assuming 5 miles per gallon of fuel, this total operation will consume approximately 83,000 gallons of diesel fuel per year.

Maintenance of the 5 vehicles involved could also result in the creation of jobs for 2 mechanics and 1 helper/tireman.

The initial benefit to the Yukon economy is the creation of 10 jobs. It is possible that there will be a pool of experienced unemployed drivers and mechanics to draw from, if Cassiar Asbestos Corporation has ceased shipping asbestos from the Cassiar Mine via Whitehorse by 1973. However, if Cassiar

*This could change if the supplier operates on a 24-hour-a-day basis, as southern suppliers do. In that case, 2 trucks may be sufficient to transport the fuel.

Along the Whitehorse route in 1971, most of the personnel unemployed as a result will probably have found jobs elsewhere by 1973. In any case the 10 jobs created could mean a reduction in the number of persons unemployed in the region.

Assuming that all personnel (and their families) related to the trucking operation live in Whitehorse, the estimated tangible annual benefits to the Yukon economy would be as follows:

1) Wages:	7-Drivers at \$13,000	\$ 91,000
	2-Mechanics at \$15,000	30,000
	1-Helper/Tireman	10,000

2) Vehicle Registrations:

5 trucks at \$360	1,800
(Vehicle Licence - \$105.	
RES to PSV permit - 255.	
<u>\$360.)</u>	

3) Fuel taxes:	83,000 gallons	11,620
	at \$0.14/gallon	-----

Total	<u>\$144,420</u>
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4) Costs of Upgrading 27 miles of the Atlin Road

The bridges on the Yukon portion of the Atlin Road have already been upgraded to H20 S16 standards;* and the Territorial Government has estimated the cost of upgrading the road itself to be \$850,000 (1971 dollars)

Annual maintenance is estimated to be \$2350 per mile after upgrading, or \$63,450 per year for the 27 mile stretch; without dust control. If dust control should be necessary, it will add a further \$2000 per mile, but it is unlikely that dust control will be necessary with the density of truck traffic anticipated.*

*Telephone conversation with K. Baker, Whitehorse, February 10, 1971.

Benefit/Cost Summary

The present value (1971 dollars) of the benefit streams to the Yukon economy for a 13 year mine life and a 20 year life are shown in Table 1. The present value of the costs of upgrading the road are also included. These costs represent the capital cost \$850,000 (1971 dollars) and the present value of the \$63,450 annual maintenance costs for the 13 (or 20) years of mine operation.* Two discount rates, 8% effective and 10% effective, were used in calculating present values as it is difficult to know what the applicable interest rates will be in 1973. The two rates used were thought to be reasonable estimates.

TABLE 1
PRESENT VALUE OF BENEFIT-COST STREAMS

<u>DISCOUNT</u> <u>RATE</u>	<u>13 YEAR MINE LIFE</u>		<u>20 YEAR MINE LIFE</u>	
	<u>BENEFITS</u>	<u>COSTS</u>	<u>BENEFITS</u>	<u>COSTS</u>
8%	\$978,621	\$1,279,951	\$1,230,094	\$1,390,434
10%	\$847,824	\$1,222,486	\$1,016,140	\$1,296,434

The present value of the 13 year tangible benefit stream is approximately \$900,000, as compared to the present value of total costs of upgrading and maintaining the road of approximately \$1,250,000.

If one assumes the mine will have its life extended to 20 years the present value of the tangible benefit stream increases to approximately \$1,125,000, and present value of total costs of upgrading and maintaining the road becomes approximately \$1,345,000.

*Present values calculated on the basis of deferred annuities of \$144,420 (benefits) and \$63,450 (maintenance costs) annually, starting in 1973 for 13 and 20 years respectively.

Considering the present value of the estimated tangible benefits it must be remembered that, firstly, the above estimate of tangible benefits is a minimum value, as income multiplier effects within the economy are not included, and secondly, one must also look at the broader picture of a producing mine near Atlin, not simply the transportation operation to and from that mine.

Kerr-Addison estimate that the producing mine will result in 200-250 families living in the area of the mine and all consumer goods, food, clothing, fuel that these families will require will have to come through the Yukon (Whitehorse) on the way to the mine. It is difficult to estimate the total impact of the transit of these goods through Whitehorse, and the potential monetary benefits to Whitehorse wholesale and retail merchants, but the total benefits will certainly be positive.

In addition, Kerr-Addison claim that they would be willing to employ Indians from the Yukon who are qualified to fill any positions they have.

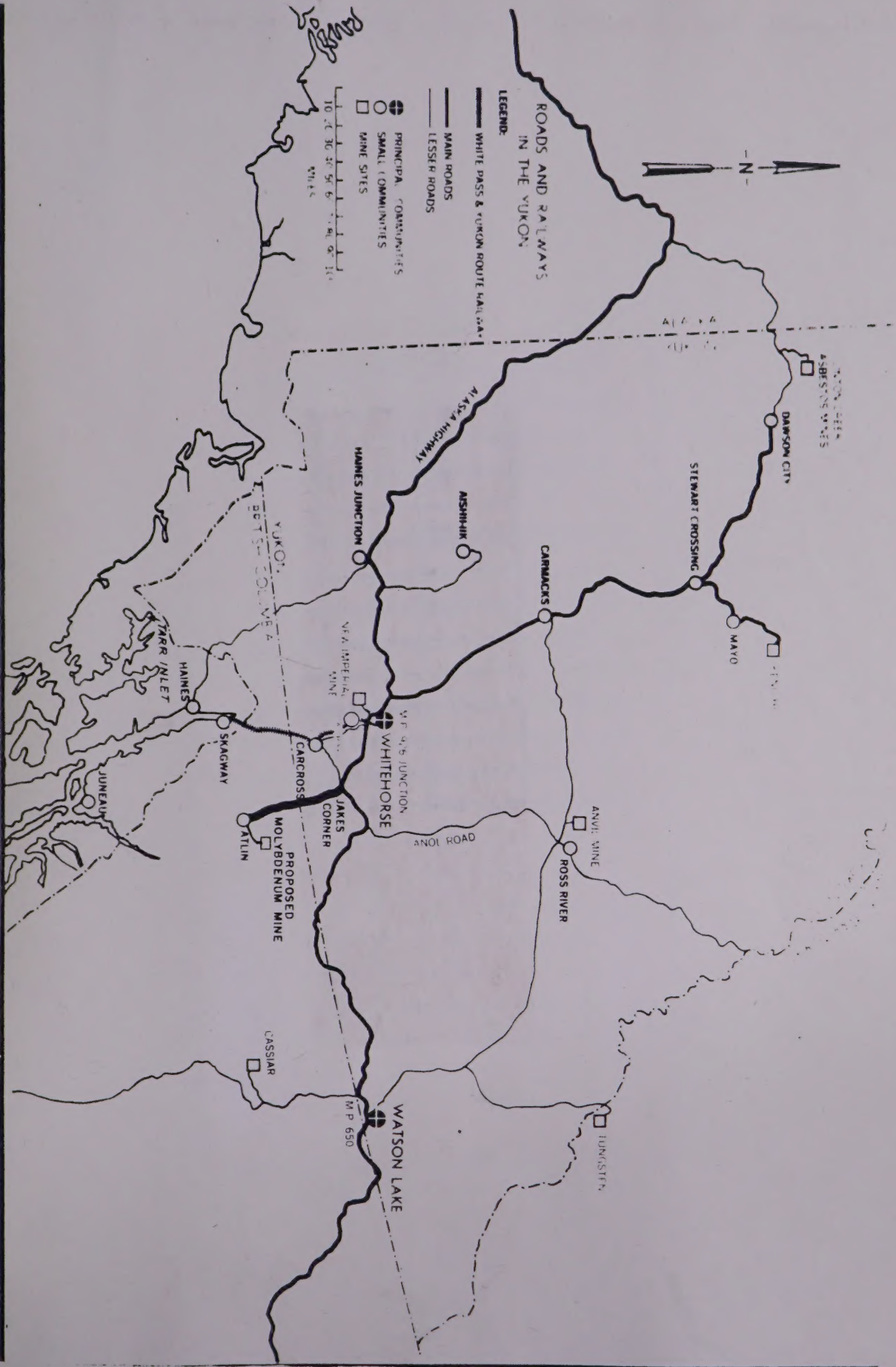
It is likely that the above potential benefits (which cannot be accurately quantified at this time) will significantly increase the total benefits over the life of the mine, be it 13 years, or 20 years.

6) Concluding Remarks

In evaluating the benefits to the Yukon economy from the trucking operations related to a producing molybdenum mine near Atlin, B.C., it must be remembered that benefits from the operation of the mine itself should also be considered. While these benefits cannot be accurately quantified at the present time, a development with a possibility of concentrating 200-250 families near Atlin will certainly have a positive effect on the Whitehorse economy as all supplies

consumer goods for the Atlin area will have to come through Whitehorse.

view of these potential benefits, and the closeness of the estimated tangible benefits to the anticipated costs of upgrading and maintaining the Yukon road, a strong case can be presented for the upgrading of the road.



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